

periods of time, after which normal development is resumed. This phenomenon is called "delayed implantation" or "embryonic diapause." In some species, such as the roe deer, black bear, badger, mink, stoat, marten, grey seal and armadillo, delayed implantation appears to be "obligate" and a normal feature of every pregnancy. In others, such as the rat, mouse, quokka and kangaroo, delayed implantation appears to be "facultative" and is known to occur naturally only as a concomitant of lactation.

This volume, though a most valuable contribution to the study of reproductive physiology, is hardly a book for the general reader. It comprises the proceedings of a three-day symposium held in January 1963 as part of Rice University's semi-centennial celebrations. It consists of nineteen papers, each with ensuing discussions, on the reproductive patterns of various species that exhibit delayed implantation and on attempts that have been made to elucidate the physiological mechanisms involved. It is well produced, with good illustrations and a useful index.

The narrative opens with a fascinating account of reproduction in the red kangaroo. In this species, the length of the first pregnancy is about thirty-three days. At birth, the single young enters the pouch where it remains and suckles for about 236 days. About two days after parturition, fertile oestrus occurs: the fertilized egg develops to a blastocyst but does not develop further until the previous young is preparing to leave, or is removed from, the pouch. Only when this occurs does the blastocyst resume its development and birth ensues about thirty-one days later. The normal gestation period may therefore vary from thirty-three to more than 234 days.

Considerable variation in gestation period is also a feature of a number of the other species considered. In the European badger, the normal "delay period" appears to be about ten months, but may be extended to over eighteen months under stress of captivity. In the mink, the gestation period can vary even between cubs of the same litter, for fertile matings regularly occur when "delay blastocysts" are already in the uterus.

Plausible explanations of the biological significance of delayed implantation can be offered in some instances. Field studies on the hill kangaroo strongly suggest that delayed implantation in this species contributes to reproductive efficiency and is likely to be of particular importance when pouch young are inadvertently lost. In some species, notably seals, that live in arctic climes where suitable conditions for parturition and mating are limited to a very short period of the year, delayed implantation with its accompanying extension of gestation may be important as a device for adjusting the reproductive cycle to the exacting conditions of the environment. A further suggestion made in respect of some of the mustelid carnivores is that mating at weaning time may serve as a means of keeping a male (probably not the father of the litter) at home when the young are most demanding of attention. Again, "lactation delay" in the rat and mouse may be seen as conferring the benefits of family planning while demanding no concern for the morrow. In many species, however, the adaptive significance of delayed implantation eludes us. Why, for example, should delayed implantation be necessary or desirable in the stoat (*Mustela erminea*) whereas it does not occur in the congeneric weasel (*M. nivalis*) living in the same areas?

The mechanisms, both environmental and physiological, by which delayed implantation is controlled, also remain largely unknown, but in this, as in all aspects of reproductive physiology, the available evidence illustrates a fascinating and perplexing diversity between species. It is clear from this book, however, that these problems are under active investigation, and that we may confidently expect in the near future a far better understanding of the problems of implantation, both delayed and otherwise.

MARCUS W. H. BISHOP

## THE TWO CULTURES

Snow, C. P. *The Two Cultures: and A Second Look*, Cambridge, 1964. Cambridge University Press. Pp. iv + 107. Price 10s. 6d.

SIR CHARLES SNOW'S Rede Lecture for 1959, *The Two Cultures*, was reviewed in Notes of the Quarter in the October 1959 number of this

REVIEW (51, 138-140). Sir Charles Darwin, the reviewer, expressed the hope that "many people will give serious attention to the important matters discussed in this Rede Lecture", and in the event it excited a degree of interest and controversy for which the author himself confesses that he was unprepared. His delineation of the separate "worlds" of the scientist and the non-scientist, and his apprehensions about the possible consequences of a continued lack of communication between them, evoked appreciation and response in many unsuspected quarters, and his thesis was for long a principal topic of debate and comment. Sir Charles considers that there is little value in a piecemeal answering of criticism, and that it is better to collect opinions, to reflect upon them at leisure, and then to develop one's argument further in whatever directions may be indicated. Hence his *Second Look*—a review of the original lecture in the light of the discussion which it started. This is now published with the lecture itself.

There has been adverse criticism of Snow's choice of the term "culture" to describe the social and intellectual phenomena which he had under consideration, and of the propriety of applying it to scientists, but he concludes that he was fully justified in its use to denote what Coleridge called the "harmonious development of those qualities and faculties which characterize our humanity". He admits that to speak of "two" cultures was perhaps begging questions, but he will not allow the minute subdivision which would detect "two thousand and two"—"the technique of the intricate defensive" which is nothing more than an expedient of "excessive unsimplicity" aimed at protection of the *status quo* against which he had launched his attack. None the less, he detects a possible emergence of a "third culture"—a spontaneous growth of a body of intellectual opinion to which persons of many diverse concerns and disciplines are unconsciously contributing, because their primary concern is how human beings live, and have lived. The development of this "third culture" will undoubtedly help to ease some of the

problems of communication between the scientific and the non-scientific cultures, and it is here that Snow sees a real hope for the future.

Readers of the lecture will remember that Sir Charles proposed as a test for scientific literacy a question about the second Law of Thermodynamics. He now considers that this was not the most suitable test, and suggests that a better one would deal with molecular biology, a subject which does not involve the same conceptual difficulties, and which exemplifies neatly some of the distinctive characteristics of the scientific culture as a whole. Further, he contends with much justification that for the same reasons the study of molecular biology should be inserted into our educational system. It is certainly in ways of this kind that scientific literacy can be promoted, but a comparable expansion of horizons needs to be contrived for the scientist if communication between the isolated cultures is to be made effective.

In the closing pages of his comment, Sir Charles returns to his primary concern with the problem of the rich and the poor. He discusses this in relation to what is, in his view, one of the most serious deficiencies of much modern literature—its apparent antipathy to the industrial-scientific revolution and all that has flowed from it. We are confronted with the perilous dichotomy which underlies this antipathy, and so with the imperative need to establish communications before it is too late—for "in a time when science is determining much of our destiny, that is, whether we live or die, it is dangerous in the most practical terms" that dialogue should be inhibited. Education alone can provide the solution.

*A Second Look*, with its valuable clarification and extension of the original arguments advanced in the Rede Lecture, should stimulate further thought and discussion of the problem of the "two cultures", and it will be particularly valuable if this leads to a development and enlargement of the idea of a third, mediating culture.

SHERWIN BAILEY